

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>12075W002</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/US 00/06254</b>	International filing date (day/month/year) <b>10/03/2000</b>	(Earliest) Priority Date (day/month/year) <b>12/03/1999</b>
Applicant <b>ALPHAGARY CORPORATION et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

- ☐ the text is approved as submitted by the applicant.
- ☒ the text has been established by this Authority to read as follows:

**BEVERAGE CONTAINER CLOSURE AND SEALANT LAYER MATERIAL**

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

- ☐ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.

☒ None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/06254

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 C08K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65D C08K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 03914 A (EASTMAN CHEM CO) 28 January 1999 (1999-01-28) page 1, line 11 - line 25 page 3, line 3 - line 5 page 11, line 19 -page 12, line 4 ---	1-4, 6-8, 10-13
A	DATABASE WPI Section Ch, Week 199904 Derwent Publications Ltd., London, GB; Class A17, AN 1999-040831 XP002141633 & JP 10 298358 A (MITSUI PETROCHEM IND CO LTD), 10 November 1998 (1998-11-10) abstract -----	1, 6, 10

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

30 June 2000

Date of mailing of the international search report

11/07/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Spettel, J

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/06254

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9903914	A	28-01-1999	EP 1000114 A	17-05-2000
JP 10298358	A	10-11-1998	NONE	

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

14.  
REC'D 17 JUL 2001

WIPO PCT

Applicant's or agent's file reference 12075WO02	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/06254	International filing date (day/month/year) 10 MARCH 2000	Priority date (day/month/year) 12 MARCH 1999
International Patent Classification (IPC) or national classification and IPC IPC(7): C08K 3/10, 3/34; C08L 23/04, 23/10 and US Cl.: 524/445, 582, 584; 523/210		
Applicant ALPHAGARY CORPORATION		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☒ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  03 OCTOBER 2000	Date of completion of this report  21 MAY 2001
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer  CALLIE SHOSHO <div style="text-align: right;"> <i>Jean Proctor</i>          Paralegal Specialist       </div>
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0661

**I. Basis of the report****1. With regard to the elements of the international application:\***

- ☒ the international application as originally filed
- ☒ the description:  
pages 1-5 , as originally filed  
pages NONE , filed with the demand  
pages NONE , filed with the letter of \_\_\_\_\_
- ☒ the claims:  
pages 6-7 , as originally filed  
pages NONE , as amended (together with any statement) under Article 19  
pages NONE , filed with the demand  
pages NONE , filed with the letter of \_\_\_\_\_
- ☒ the drawings:  
pages NONE , as originally filed  
pages NONE , filed with the demand  
pages NONE , filed with the letter of \_\_\_\_\_
- ☒ the sequence listing part of the description:  
pages NONE , as originally filed  
pages NONE , filed with the demand  
pages NONE , filed with the letter of \_\_\_\_\_

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

**4. ☒ The amendments have resulted in the cancellation of:**

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/fig NONE

**5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\*Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. statement**

Novelty (N)	Claims <u>5, 9</u>	YES
	Claims <u>1-4, 6-8, 10-13</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-13</u>	NO
Industrial Applicability (IA)	Claims <u>1-13</u>	YES
	Claims <u>NONE</u>	NO

**2. citations and explanations (Rule 70.7)**

1. Claims 1-4, 6-8, and 10-13 lack novelty under PCT Article 33(2) as being anticipated by WO 93/04118.

WO 93/04118 disclose a melt-processible composition comprising (i) thermoplastic polymer such as polyolefin including polyethylene, polypropylene, and ethylene-propylene copolymer as well as polystyrene and poly(styrene)-poly(butadiene)-poly(styrene) and (ii) layered montmorillonite clay having platelets with diameter ranging from 0.005 to 1 micron wherein the composition is used to form molded articles such as containers. There is also disclosed a method for decreasing the gas permeability of the thermoplastic material by using the montmorillonite clay as disclosed above ( page 5, lines 14-19, page 8, lines 30-31, page 9, lines 3 and 26-28, page 11, line 36, page 18, line 18, page 21, lines 3-5, page 26, lines 7 and 10-13, page 29, lines 30-32, page 30, lines 1-2, page 31, lines 27-29, page 33, lines 27-30, page 37, lines 31-37, page 38, line 3, page 40, lines 27-21).

In light of the above, it is clear that WO 93/04118 anticipates the present claims.

2. Claims 1-4, 6-8, and 10-13 lack novelty under PCT Article 33(2) as being anticipated by Christiani et al. (U.S. 5,747,560).

Christiani et al. disclose a melt-processible composition comprising (i) thermoplastic polymer such as polyolefin including polyethylene, polypropylene, and ethylene-propylene copolymer as well as polystyrene and poly(styrene)-poly(butadiene)-poly(styrene) and (ii) layered montmorillonite clay having platelets with diameter ranging from 0.005 to 1 micron wherein the composition is used to form molded articles such as containers. There is also disclosed a method for decreasing the gas permeability of the thermoplastic material by using the montmorillonite clay as disclosed above ( col.5, lines 20-30, col.7, lines 35-41, col.16, lines 41-44, col.17, lines 48-50, col.18, lines 7 and 21-23, col.20, lines 12-13, col.22, lines 2-3, col.24, lines 15-16, and col.25, lines 35-37).

In light of the above, it is clear that Christiani et al. anticipates the present claims.

(Continued on Supplemental Sheet.)

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/06254

**VI. Certain documents cited****1. Certain published documents (Rule 70.10)**

<u>Application No. Patent No.</u>	<u>Publication Date (day/month/year)</u>	<u>Filing Date (day/month/year)</u>	<u>Priority date (valid claim) (day/month/year)</u>
US, A, 6,071,988	06 JUNE 2000	22 DECEMBER 1997	31 DECEMBER 1996
US, A, 6,117,541	12 SEPT 2000	02 JULY 1997	

**2. Non-written disclosures (Rule 70.9)**Kind of non-written disclosureDate of non-written disclosure  
(day/month/year)Date of written disclosure  
referring to non-written disclosure  
(day/month/year)

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 1-13 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because the claims are indefinite for the following reason(s):

Claims 1, 6, and 10 recite "a quantity of layered magnesium aluminum silicate". The scope of the claim is confusing because it is not clear what is meant by "a quantity". How much layered magnesium aluminum silicate be used to be considered "a quantity"?



**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

**V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):**

3. Claims 10 and 13 lack novelty under PCT Article 33(2) as being anticipated by WO 98/29499.

WO 98/29499 discloses a method for decreasing the gas permeability of a thermoplastic material by using layered montmorillonite clay (col.5, lines 5-17 and col.6, lines 8-10).

In light of the above, it is clear that WO 98/29499 anticipates the present claims.

4. Claims 10-13 lack novelty under PCT Article 33(2) as being anticipated by Beall et al. (U.S. 5,830,528).

Beall et al. disclose a method for decreasing the gas permeability of a thermoplastic material such as polyolefin including polyethylene, polypropylene, and ethylene-propylene copolymer by using layered montmorillonite clay (col.8, lines 50-64, col.20, lines 27-29 and 54, and col.27, lines 15-21).

In light of the above, it is clear that Beall et al. anticipates the present claims.

5. Claims 1, 4-6, 8, 10, and 13 lack novelty under PCT Article 33(2) as being anticipated by WO 99/03914.

WO 99/03914 disclose a melt-processible composition comprising (i) thermoplastic polymer and (ii) layered montmorillonite clay having platelets with diameter ranging from 0.01 to 1 micron wherein the composition is used to form molded articles such as containers. There is also disclosed a method for decreasing the gas permeability of the thermoplastic material by using the montmorillonite clay as disclosed above (page 1, lines 11-25, page 3, lines 3-5, page 11, line 19- page 12, line 4, page 13, lines 18-19, and page 16, line 16).

6. Claims 5 and 9 lack an inventive step under PCT Article 33(3) as being obvious over WO 93/04118 or Christiani et al. (U.S. 5,747,560).

The disclosures with respect to either WO 93/04118 or Christiani et al. in paragraphs 1 and 2, respectively, are incorporated here by reference.

The difference between either WO 93/04118 or Christiani et al. and the present claimed invention is the requirement in the claims of beverage container closure and beverage container sealant.

Both WO 93/04118 and Christiani et al. disclose melt-processible compositions which are used to form molded articles including beverage containers, but neither specifically discloses that the articles are suitable for use as a closure or a sealant for such a container. However, given the generic disclosure of container by either WO 93/04118 or Christiani et al. as well as the disclosure of both references that the compositions decrease the gas permeability of thermoplastic material, it therefore would have been obvious to one of ordinary skill in the art to utilize the composition in any portion of the container, including the closure or sealant layer as presently claimed, where it is important that gas permeability is decreased in order to preserve the beverage present inside the container, and thereby arrive at the claimed invention.

With respect to applicants arguments filed in the letter of 2/26/01, it is noted that, absent evidence to the contrary, the broad disclosure of containers by either Christiani et al. or WO 93/04118 clearly encompasses all parts of a container including closure and sealant layer. Further, it is noted that while claims 5 and 9 are drawn to beverage container closure and beverage container sealant layer respectively, there are no structural limitations regarding the closure or sealant layer, and thus, the patentability of each of the claims is dependent on the compositional limitations which are met by either Christiani et al. or WO 93/04118.

Thus, given that Christiani et al. or WO 93/04118 (i) broadly disclose containers and (ii) disclose composition identical to that presently claimed including that the composition decreases the gas permeability of thermoplastic material and given that the patentability of claims 5 and 9 depends on the composition, it therefore would have been obvious to one of ordinary skill in the art to utilize the composition of WO 93/04118 or Christiani et al. in any portion of the container, including the closure or sealant layer as presently claimed, where it is important that gas permeability is decreased in order to preserve the beverage present inside the container, and thereby arrive at the claimed invention.

7. Claims 1-13 meet the criteria set out in PCT Article 33(4), because the invention has industrial applicability as beverage container closure or sealant layer.

## ----- NEW CITATIONS -----

WO 93/04118 A1 (MAXFIELD ET AL.) 04 MARCH 1993 (04/03/93), page 5, lines 14-19, page 8, lines 30-31, page 9, lines 3 and 26-28, page 11, line 36, page 18, line 18, page 21, lines 3-5, page 26, lines 7 and 10-13, page 29, lines 30-32, page 30,

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 11

lines 1-2, page 31, lines 27-29, page 33, lines 27-30, page 37, lines 31-37, page 38, line 3, and page 40, lines 27-21.

US 5,747,560 A (CHRISTIANI ET AL.) 05 MAY 1998 (05/05/98), col.5, lines 20-30, col.7, lines 35-41, col.16, lines 41-44, col.17, lines 48-50, col.18, lines 7 and 21-23, col.20, lines 12-13, col.22, lines 2-3, col.24, lines 15-16, and col.25, lines 35-37.

WO 98/29499 A1 (MATAYABAS ET AL.) 09 JULY 1998 (09/07/98), col.5, lines 5-17 and col.6, lines 8-10.

US 5,830,528 A (BEALL ET AL.) 03 NOVEMBER 1998 (03/11/98), col.8, lines 50-64, col.20, lines 27-29 and 54, and col.27, lines 15-21.

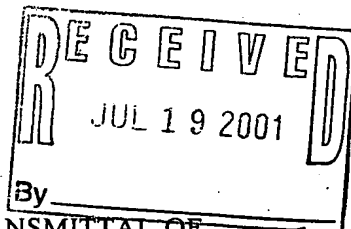
12075 WO02

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To: ROBERT W. FIESELER  
MCANDREWS HELD & MALLOY, LTD.  
500 W. MADISON STREET  
34TH FLOOR  
CHICAGO IL 60661

PCT



NOTIFICATION OF TRANSMITTAL OF  
INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing  
(day/month/year)

13 JUL 2001

Applicant's or agent's file reference

12075WO02

## IMPORTANT NOTIFICATION

International application No.

PCT/US00/06254

International filing date (day/month/year)

10 MARCH 2000

Priority Date (day/month/year)

12 MARCH 1999

Applicant

ALPHAGARY CORPORATION

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

CALLIE SHOSHO

Jean Proctor  
Paralegal Specialist

Telephone No. (703) 308-0661

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

## PCT

### NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

To: ROBERT W. FIESELER  
MCANDREWS HELD & MALLOY, LTD.  
500 W. MADISON STREET  
34TH FLOOR  
CHICAGO IL 60661

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13 JUL 2001

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Name and mailing address of the IPEA/US  
Commissioner of Patents and Trademarks  
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Washington, D.C. 20231

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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 12075WO02	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/06254	International filing date ( <i>day/month/year</i> ) 10 MARCH 2000	Priority date ( <i>day/month/year</i> ) 12 MARCH 1999
International Patent Classification (IPC) or national classification and IPC IPC(7): CO8K 3/10, 3/34; C08L 23/04, 23/10 and US Cl.: 524/445, 582, 584; 523/210		
Applicant ALPHAGARY CORPORATION		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
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3.	This report contains indications relating to the following items: <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step or industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input checked="" type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input checked="" type="checkbox"/> Certain observations on the international application</li> </ul>

Date of submission of the demand  03 OCTOBER 2000	Date of completion of this report  21 MAY 2001
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231  Facsimile No. (703) 305-3230	Authorized officer  CALLIE SHOSHO Jean Proctor Paralegal Specialist  Telephone No. (703) 308-0661

**I. Basis of the report****1. With regard to the elements of the international application:\***☒ the international application as originally filed☒ the description:

pages 1-5, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_

☒ the claims:

pages 6-7, as originally filed  
pages NONE, as amended (together with any statement) under Article 19  
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pages NONE, filed with the letter of \_\_\_\_\_

☒ the drawings:

pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_

☒ the sequence listing part of the description:

pages NONE, as originally filed  
pages NONE, filed with the demand  
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**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

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- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).  
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☒ the description, pages NONE  
☒ the claims, Nos. NONE  
☒ the drawings, sheets/fig NONE

**5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\*Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. statement**

Novelty (N)	Claims <u>5, 9</u>	YES
	Claims <u>1-4, 6-8, 10-13</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-13</u>	NO
Industrial Applicability (IA)	Claims <u>1-13</u>	YES
	Claims <u>NONE</u>	NO

**2. citations and explanations (Rule 70.7)**

1. Claims 1-4, 6-8, and 10-13 lack novelty under PCT Article 33(2) as being anticipated by WO 93/04118.

WO 93/04118 disclose a melt-processible composition comprising (i) thermoplastic polymer such as polyolefin including polyethylene, polypropylene, and ethylene-propylene copolymer as well as polystyrene and poly(styrene)-poly(butadiene)-poly(styrene) and (ii) layered montmorillonite clay having platelets with diameter ranging from 0.005 to 1 micron wherein the composition is used to form molded articles such as containers. There is also disclosed a method for decreasing the gas permeability of the thermoplastic material by using the montmorillonite clay as disclosed above ( page 5, lines 14-19, page 8, lines 30-31, page 9, lines 3 and 26-28, page 11, line 36, page 18, line 18, page 21, lines 3-5, page 26, lines 7 and 10-13, page 29, lines 30-32, page 30, lines 1-2, page 31, lines 27-29, page 33, lines 27-30, page 37, lines 31-37, page 38, line 3, page 40, lines 27-21).

In light of the above, it is clear that WO 93/04118 anticipates the present claims.

2. Claims 1-4, 6-8, and 10-13 lack novelty under PCT Article 33(2) as being anticipated by Christiani et al. (U.S. 5,747,560).

Christiani et al. disclose a melt-processible composition comprising (i) thermoplastic polymer such as polyolefin including polyethylene, polypropylene, and ethylene-propylene copolymer as well as polystyrene and poly(styrene)-poly(butadiene)-poly(styrene) and (ii) layered montmorillonite clay having platelets with diameter ranging from 0.005 to 1 micron wherein the composition is used to form molded articles such as containers. There is also disclosed a method for decreasing the gas permeability of the thermoplastic material by using the montmorillonite clay as disclosed above ( col.5, lines 20-30, col.7, lines 35-41, col.16, lines 41-44, col.17, lines 48-50, col.18, lines 7 and 21-23, col.20, lines 12-13, col.22, lines 2-3, col.24, lines 15-16, and col.25; lines 35-37).

In light of the above, it is clear that Christiani et al. anticipates the present claims.

(Continued on Supplemental Sheet.)

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/06254

## VI. Certain documents cited

## 1. Certain published documents (Rule 70.10)

<u>Application No. Patent No.</u>	<u>Publication Date (day/month/year)</u>	<u>Filing Date (day/month/year)</u>	<u>Priority date (valid claim) (day/month/year)</u>
US, A, 6,071,988	06 JUNE 2000	22 DECEMBER 1997	31 DECEMBER 1996
US, A, 6,117,541	12 SEPT 2000	02 JULY 1997	

## 2. Non-written disclosures (Rule 70.9)

Kind of non-written disclosureDate of non-written disclosure  
(day/month/year)Date of written disclosure  
referring to non-written disclosure  
(day/month/year)



**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 1-13 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because the claims are indefinite for the following reason(s):

Claims 1, 6, and 10 recite "a quantity of layered magnesium aluminum silicate". The scope of the claim is confusing because it is not clear what is meant by "a quantity". How much layered magnesium aluminum silicate be used to be considered "a quantity"?

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

**V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):**

3. Claims 10 and 13 lack novelty under PCT Article 33(2) as being anticipated by WO 98/29499.

WO 98/29499 discloses a method for decreasing the gas permeability of a thermoplastic material by using layered montmorillonite clay (col. 5, lines 5-17 and col. 6, lines 8-10).

In light of the above, it is clear that WO 98/29499 anticipates the present claims.

4. Claims 10-13 lack novelty under PCT Article 33(2) as being anticipated by Beall et al. (U.S. 5,830,528).

Beall et al. disclose a method for decreasing the gas permeability of a thermoplastic material such as polyolefin including polyethylene, polypropylene, and ethylene-propylene copolymer by using layered montmorillonite clay (col. 8, lines 50-64, col. 20, lines 27-29 and 54, and col. 27, lines 15-21).

In light of the above, it is clear that Beall et al. anticipates the present claims.

5. Claims 1, 4-6, 8, 10, and 13 lack novelty under PCT Article 33(2) as being anticipated by WO 99/03914.

WO 99/03914 disclose a melt-processible composition comprising (i) thermoplastic polymer and (ii) layered montmorillonite clay having platelets with diameter ranging from 0.01 to 1 micron wherein the composition is used to form molded articles such as containers. There is also disclosed a method for decreasing the gas permeability of the thermoplastic material by using the montmorillonite clay as disclosed above (page 1, lines 11-25, page 3, lines 3-5, page 11, line 19- page 12, line 4, page 13, lines 18-19, and page 16, line 16).

6. Claims 5 and 9 lack an inventive step under PCT Article 33(3) as being obvious over WO 93/04118 or Christiani et al. (U.S. 5,747,560).

The disclosures with respect to either WO 93/04118 or Christiani et al. in paragraphs 1 and 2, respectively, are incorporated here by reference.

The difference between either WO 93/04118 or Christiani et al. and the present claimed invention is the requirement in the claims of beverage container closure and beverage container sealant.

Both WO 93/04118 and Christiani et al. disclose melt-processible compositions which are used to form molded articles including beverage containers, but neither specifically discloses that the articles are suitable for use as a closure or a sealant for such a container. However, given the generic disclosure of container by either WO 93/04118 or Christiani et al. as well as the disclosure of both references that the compositions decrease the gas permeability of thermoplastic material, it therefore would have been obvious to one of ordinary skill in the art to utilize the composition in any portion of the container, including the closure or sealant layer as presently claimed, where it is important that gas permeability is decreased in order to preserve the beverage present inside the container, and thereby arrive at the claimed invention.

With respect to applicants arguments filed in the letter of 2/26/01, it is noted that, absent evidence to the contrary, the broad disclosure of containers by either Christiani et al. or WO 93/04118 clearly encompasses all parts of a container including closure and sealant layer. Further, it is noted that while claims 5 and 9 are drawn to beverage container closure and beverage container sealant layer respectively, there are no structural limitations regarding the closure or sealant layer, and thus, the patentability of each of the claims is dependent on the compositional limitations which are met by either Christiani et al. or WO 93/04118.

Thus, given that Christiani et al. or WO 93/04118 (i) broadly disclose containers and (ii) disclose composition identical to that presently claimed including that the composition decreases the gas permeability of thermoplastic material and given that the patentability of claims 5 and 9 depends on the composition, it therefore would have been obvious to one of ordinary skill in the art to utilize the composition of WO 93/04118 or Christiani et al. in any portion of the container, including the closure or sealant layer as presently claimed, where it is important that gas permeability is decreased in order to preserve the beverage present inside the container, and thereby arrive at the claimed invention.

7. Claims 1-13 meet the criteria set out in PCT Article 33(4), because the invention has industrial applicability as beverage container closure or sealant layer.

**----- NEW CITATIONS -----**

WO 93/04118 A1 (MAXFIELD ET AL.) 04 MARCH 1993 (04/03/93), page 5, lines 14-19, page 8, lines 30-31, page 9, lines 3 and 26-28, page 11, line 36, page 18, line 18, page 21, lines 3-5, page 26, lines 7 and 10-13, page 29, lines 30-32, page 30,

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 11

lines 1-2, page 31, lines 27-29, page 33, lines 27-30, page 37, lines 31-37, page 38, line 3, and page 40, lines 27-21.

US 5,747,560 A (CHRISTIANI ET AL.) 05 MAY 1998 (05/05/98), col.5, lines 20-30, col.7, lines 35-41, col.16, lines 41-44, col.17, lines 48-50, col.18, lines 7 and 21-23, col.20, lines 12-13, col.22, lines 2-3, col.24, lines 15-16, and col.25, lines 35-37.

WO 98/29499 A1 (MATAYABAS ET AL.) 09 JULY 1998 (09/07/98), col.5, lines 5-17 and col.6, lines 8-10.

US 5,830,528 A (BEALL ET AL.) 03 NOVEMBER 1998 (03/11/98), col.8, lines 50-64, col.20, lines 27-29 and 54, and col.27, lines 15-21.

# INTERNATIONAL SEARCH REPORT

Inter. Application No  
PCT/82/00/06254

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 C08K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B65D C08K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	W0 99 03914 A (EASTMAN CHEM CO) 28 January 1999 (1999-01-28) page 1, line 11 - line 25 page 3, line 3 - line 5 page 11, line 19 -page 12, line 4 ---	1-4, 6-8, 10-13
A	DATABASE WPI Section Ch, Week 199904 Derwent Publications Ltd., London, GB; Class A17, AN 1999-040831 XP002141633 & JP 10 298358 A (MITSUI PETROCHEM IND CO LTD), 10 November 1998 (1998-11-10) abstract -----	1, 6, 10

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search

30 June 2000

Date of mailing of the international search report

11/07/2000

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Spettel, J

# INTERNATIONAL SEARCH REPORT

inform: [redacted] patent family members

Inter: [redacted] Application No

PCT/CS 00/06254

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9903914	A	28-01-1999	EP 1000114 A	17-05-2000
JP 10298358	A	10-11-1998	NONE	

# INTERNATIONAL SEARCH REPORT

Inter. Application No  
PCT/00 00/06254

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 C08K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B65D C08K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 03914 A (EASTMAN CHEM CO) 28 January 1999 (1999-01-28) page 1, line 11 - line 25 page 3, line 3 - line 5 page 11, line 19 -page 12, line 4 -----	1-4, 6-8, 10-13
A	DATABASE WPI Section Ch, Week 199904 Derwent Publications Ltd., London, GB; Class A17, AN 1999-040831 XP002141633 & JP 10 298358 A (MITSUI PETROCHEM IND CO LTD), 10 November 1998 (1998-11-10) abstract -----	1, 6, 10

☐ Further documents are listed in the continuation of box C.

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\* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

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Date of the actual completion of the international search

30 June 2000

Date of mailing of the international search report

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Spettel, J



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup>:</b> <b>C08K 9/00</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/53672</b> <b>(43) International Publication Date:</b> 14 September 2000 (14.09.00)
<b>(21) International Application Number:</b> PCT/US00/06254 <b>(22) International Filing Date:</b> 10 March 2000 (10.03.00) <b>(30) Priority Data:</b> 60/124,102      12 March 1999 (12.03.99)      US <b>(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application</b> US      60/124, 102 (CON) Filed on      12 March 1999 (12.03.99) <b>(71) Applicant (for all designated States except US):</b> ALPHAGARY CORPORATION [US/US]; Pioneer Industrial Park, P.O. Box 808, Leominster, MA 01453 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> NASEEM, Homaira [US/US]; 14 Slyvan Lane, Boylston, MA 01505 (US). O'HARA, Charles, J. [US/US]; 13 Captain Samuel Forbush Road, Westboro, MA 01581 (US). <b>(74) Agents:</b> FIESELER, Robert, W. et al.; McAndrews, Held & Malloy, Ltd., 34th floor, 500 W. Madison Street, Chicago, IL 60661 (US).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
<b>(54) Title:</b> BEVERAGE CONTAINER CLOSURE AND SEALANT LAYER MATERIAL		
<b>(57) Abstract</b>  <p>A melt-processible composition for molding closures and sealant layers for beverage containers has improved gas barrier properties. The composition comprises: a) a thermoplastic base polymeric material and b) a quantity of layered magnesium aluminum silicate clay having platelets with a diameter of approximately 1 micron. The magnesium aluminum silicate clay is preferably nanocomposite, montmorillonite clay. The preferred base material for beverage container closures is polypropylene, polyethylene and/or a propylene/ethylene copolymer. The preferred base material for beverage container sealant layers is an ethylene-vinyl acetate copolymer, polyethylene, styrene ethylene butadiene styrene polymer, styrene butadiene styrene polymer, ethylene propylene diene monomer, and metallocene polymers.</p>		

## BEVERAGE CONTAINER CLOSURE AND SEALANT LAYER MATERIAL

Field Of The Invention

The present invention relates to thermoplastic materials used to mold beverage container closures and sealant layers. More particularly, the present invention relates to thermoplastic materials having improved gas barrier properties.

Background Of The Invention

Beverage containers formed from moldable thermoplastic such as polyethylene terephthalate generally have a threaded opening that accommodates a threaded closure or cap. The closure is molded from thermoplastic materials such as polypropylene homopolymer, polypropylene copolymer, and high density polyethylene. A sealant layer or liner is generally interposed between the closure and the beverage container to prevent fluid leakage from or into the container.

An important property of beverage container closure and sealant layer materials is the barrier or permeability of the materials. In this regard, traditional polypropylene and polyethylene closure and sealant materials were developed without primary regard for their gas barrier properties. More recently, efforts have been made to develop improved closure and sealant materials having lower permeability to oxygen and carbon dioxide. Such improved materials would be preferred for beverage containers, especially carbonated beverage containers, for which extended shelf life and beverage quality is demanded.

It has been found that the addition of



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nanocomposite, montmorillonite clay to thermoplastic materials used in the molding of beverage container closures and sealant layers improves the barrier properties of the materials. Specifically, the addition of montmorillonite clay decreases the permeability of such thermoplastic materials to oxygen and carbon dioxide.

#### Summary Of The Invention

A melt-processible composition for molding closures for beverage containers has improved gas barrier properties. The composition comprises:

- (a) a thermoplastic base polymeric material;
- (b) a quantity of layered magnesium aluminum silicate clay having platelets with a diameter of approximately 1 micron.

In the preferred closure composition, the thermoplastic base polymeric material comprises a polyolefin such as polypropylene, polyethylene and/or a copolymer comprising propylene and ethylene monomeric units.

The layered magnesium aluminum silicate clay is preferably a nanocomposite, montmorillonite clay.

A melt-processible composition for molding sealant layers for beverage containers also has improved gas barrier properties. The composition comprises:

- (a) a thermoplastic base polymeric material;
- (b) a quantity of layered magnesium aluminum silicate clay having platelets with a diameter of approximately 1 micron.

In the preferred sealant layer composition, the thermoplastic base polymeric material comprises ethylene

vinyl acetate copolymer, polyethylene (linear low density polyethylene, low density polyethylene, ultra-low density polyethylene, and high density polyethylene), styrene ethylene butadiene styrene polymer (commercially available from Shell under the trade designation KRATON®), styrene butadiene styrene polymer, ethylene propylene diene monomer, and metallocene polymers. The layered magnesium aluminum silicate clay is preferably nanocomposite, montmorillonite clay.

A method of decreasing the gas permeability of a thermoplastic material comprises introducing a quantity of layered magnesium aluminum silicate clay into the material. The preferred magnesium aluminum silicate clay is nanocomposite, montmorillonite clay.

#### Detailed Description Of The Preferred Embodiments

Polypropylene-based thermoplastic compositions, suitable for molding beverage container closures, were prepared using the following formulations:

##### Sample No. 98-006 control:

<u>Material</u>	<u>Chemical Composition</u>	<u>Parts by Weight</u>
Montell CA 012	Polypropylene copolymer	97
5019466JEMB	White color masterbatch	3

##### Sample No. 98-006 B:

<u>Material</u>	<u>Chemical Composition</u>	<u>Parts by Weight</u>
Montell CA 012	Polypropylene copolymer	95
5019466JEMB	White color masterbatch	3
Cloisite 25 A	Nanocomposite clay	3 to 10

The oxygen permeability for plaques (30 mils nominal thickness) of each of the above samples was measured on a Mocon Ox-Tran 10/50A analyzer at 23.2°C and 0% relative

humidity. The system was purged for 2 hours and each plaque was conditioned in a 100% oxygen atmosphere overnight prior to testing. Test area was 50 cm<sup>2</sup>. Oxygen permeability was measured on three plaques for each sample and the results were averaged and reported below:

<u>Sample</u>	<u>Oxygen Permeability (cc/m<sup>2</sup>/day)</u>
98-006 control	110.8
98-006 B	90.6

The above results showed that the addition of nanocomposite, montmorillonite clay to the polypropylene copolymeric thermoplastic base material decreased the oxygen permeability of the material by approximately 18%.

Ethylene-vinyl acetate (EVA) thermoplastic compositions, suitable for molding beverage container liners, were prepared using the following formulations:

Sample No. 240-6C control:

<u>Material</u>	<u>Chemical Composition</u>	<u>Parts by Weight</u>
UE 655	9% EVA 2 melt index	15
UE 635	9% EVA 9.8 melt index	85
Escorene 3505G	Polypropylene homopolymer 400 melt index	5
Crodamine ER	Erucamide	1
Aldo MS	Glycerol monostearate	0.1

Sample No. 97-692:

<u>Material</u>	<u>Chemical Composition</u>	<u>Parts by Weight</u>
UE 655	9% EVA 2 melt index	5 to 15
UE 635	9% EVA 9.8 melt index	80 to 100
Escorene 3505G	Polypropylene homopolymer 400 melt index	3 to 10
Crodamine ER	Erucamide	0.5 to 2.0

Cloisite 25 A	Nanocomposite clay	3 to 10
Aldo MS	Glycerol monostearate	0.1 to 0.5

5           The oxygen permeability for plaques (30 mils nominal thickness) of each of the above samples was measured on a Mocon Ox-Tran 10/50A analyzer at 23.2°C and 0% relative humidity. The system was purged for 2 hours and each  
10        plaque was conditioned in a 100% oxygen atmosphere overnight prior to testing. Test area was 50 cm<sup>2</sup>. Oxygen permeability was measured on three plaques for each sample and the results were averaged and reported below:

	<u>Sample</u>	<u>Oxygen Permeability (cc/m<sup>2</sup>/day)</u>
15	240-6C control	343.8
	97-692	302.2

20        The above results showed that the addition of montmorillonite clay to the EVA thermoplastic base material decreased the oxygen permeability by approximately 12%.

25        The permeability to carbon dioxide, as measured in % gas loss/day, improved approximately 15% (i.e., the % gas loss/day decreased approximately 15%) with the addition of nanocomposite, montmorillonite clay.

What is claimed is:

1. A melt-processible composition for molding closures for beverage containers comprising:

- 5 (a) a thermoplastic base polymeric material;  
(b) a quantity of layered magnesium aluminum silicate clay having platelets with a diameter of approximately 1 micron.

10 2. The composition of claim 1 wherein said thermoplastic base polymeric material comprises a polyolefin.

15 3. The composition of claim 2 wherein said polyolefin is selected from the group consisting of polypropylene, polyethylene and a copolymer comprising propylene and ethylene monomeric units.

20 4. The composition of claim 1 wherein said layered magnesium aluminum silicate clay is montmorillonite clay.

5. A beverage container closure molded from the composition of claim 1.

25 6. A melt-processible composition for molding sealant layers for beverage containers comprising:

- (a) a thermoplastic base polymeric material;  
(b) a quantity of layered magnesium aluminum silicate clay having platelets with a diameter of  
30 approximately 1 micron.

7. The composition of claim 7 wherein said

thermoplastic base polymeric material is selected from the group consisting of ethylene vinyl acetate copolymer, polyethylene, styrene ethylene butadiene styrene polymer, styrene butadiene styrene polymer, ethylene propylene diene monomer, and metallocene polymers.

8. The composition of claim 6 wherein said layered magnesium aluminum silicate clay is montmorillonite clay.

9. A beverage container sealant layer molded from the composition of claim 6.

10. A method of decreasing the gas permeability of a thermoplastic material, said method comprising introducing a quantity of layered magnesium aluminum silicate clay to said material.

11. The method of claim 10 wherein said thermoplastic material is a polyolefin.

12. The method of claim 11 wherein said polyolefin is selected from the group consisting of polypropylene, polyethylene and a copolymer comprising propylene and ethylene monomeric units.

13. The method of claim 10 wherein said layered magnesium aluminum silicate clay is montmorillonite clay.

524/445,507,589 - 523/210

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/06254

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)	Claims	<u>5, 9</u>	YES
	Claims	<u>1-4, 6-8, 10-13</u>	NO
Inventive Step (IS)	Claims	<u>NONE</u>	YES
	Claims	<u>1-13</u>	NO
Industrial Applicability (IA)	Claims	<u>1-13</u>	YES
	Claims	<u>NONE</u>	NO

2. citations and explanations (Rule 70.7)

1. Claims 1-4, 6-8, and 10-13 lack novelty under PCT Article 33(2) as being anticipated by WO 93/04118.

WO 93/04118 disclose a melt-processible composition comprising (i) thermoplastic polymer such as polyolefin including polyethylene, polypropylene, and ethylene-propylene copolymer as well as polystyrene and poly(styrene)-poly(butadiene)-poly(styrene) and (ii) layered montmorillonite clay having platelets with diameter ranging from 0.005 to 1 micron wherein the composition is used to form molded articles such as containers. There is also disclosed a method for decreasing the gas permeability of the thermoplastic material by using the montmorillonite clay as disclosed above ( page 5, lines 14-19, page 8, lines 30-31, page 9, lines 3 and 26-28, page 11, line 36, page 18, line 18, page 21, lines 3-5, page 26, lines 7 and 10-13, page 29, lines 30-32, page 30, lines 1-2, page 31, lines 27-29, page 33, lines 27-30, page 37, lines 31-37, page 38, line 3, page 40, lines 27-31).

In light of the above, it is clear that WO 93/04118 anticipates the present claims.

2. Claims 1-4, 6-8, and 10-13 lack novelty under PCT Article 33(2) as being anticipated by Christiani et al. (U.S. 5,747,560).

Christiani et al. disclose a melt-processible composition comprising (i) thermoplastic polymer such as polyolefin including polyethylene, polypropylene, and ethylene-propylene copolymer as well as polystyrene and poly(styrene)-poly(butadiene)-poly(styrene) and (ii) layered montmorillonite clay having platelets with diameter ranging from 0.005 to 1 micron wherein the composition is used to form molded articles such as containers. There is also disclosed a method for decreasing the gas permeability of the thermoplastic material by using the montmorillonite clay as disclosed above ( col.5, lines 20-30, col.7, lines 35-41, col.16, lines 41-44, col.17, lines 48-50, col.18, lines 7 and 21-23, col.20, lines 12-13, col.22, lines 2-3, col.24, lines 15-16, and col.25, lines 35-37).

In light of the above, it is clear that Christiani et al. anticipates the present claims.

(Continued on Supplemental Sheet.)

use to make molded articles including  
containers

24, 17





## Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

## V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

3. Claims 10 and 13 lack novelty under PCT Article 33(2) as being anticipated by WO 98/29499. WO 98/29499 discloses a method for decreasing the gas permeability of a thermoplastic material by using layered montmorillonite clay (col.5, lines 5-17 and col.6, lines 8-10). *5, 1-5 + 9-10 + 15-19*  
In light of the above, it is clear that WO 98/29499 anticipates the present claims. *3, 25-29*
4. Claims 10-13 lack novelty under PCT Article 33(2) as being anticipated by Beall et al. (U.S. 5,830,528). Beall et al. disclose a method for decreasing the gas permeability of a thermoplastic material such as polyolefin including polyethylene, polypropylene, and ethylene-propylene copolymer by using layered montmorillonite clay (col.8, lines 50-64, col.20, lines 27-29 and 54, and col.27, lines 15-21).  
In light of the above, it is clear that Beall et al. anticipates the present claims.
5. Claims 1, 4-6, 8, 10, and 13 lack novelty under PCT Article 33(2) as being anticipated by WO 99/03914. WO 99/03914 disclose a melt-processible composition comprising (i) thermoplastic polymer and (ii) layered montmorillonite clay having platelets with diameter ranging from 0.01 to 1 micron wherein the composition is used to form molded articles such as containers. There is also disclosed a method for decreasing the gas permeability of the thermoplastic material by using the montmorillonite clay as disclosed above (page 1, lines 11-25, page 3, lines 3-5, page 11, line 19- page 12, line 4, page 13, lines 18-19, and page 16, line 16).
6. Claims 5 and 9 lack an inventive step under PCT Article 33(3) as being obvious over WO 93/04118 or Christiani et al. (U.S. 5,747,560).  
The disclosures with respect to either WO 93/04118 or Christiani et al. in paragraphs 1 and 2, respectively, are incorporated here by reference.  
The difference between either WO 93/04118 or Christiani et al. and the present claimed invention is the requirement in the claims of beverage container closure and beverage container sealant.  
Both WO 93/04118 and Christiani et al. disclose melt-processible compositions which are used to form molded articles including beverage containers, but neither specifically discloses that the articles are suitable for use as a closure or a sealant for such a container. However, given the generic disclosure of container by either WO 93/04118 or Christiani et al. as well as the disclosure of both references that the compositions decrease the gas permeability of thermoplastic material, it therefore would have been obvious to one of ordinary skill in the art to utilize the composition in any portion of the container, including the closure or sealant layer as presently claimed, where it is important that gas permeability is decreased in order to preserve the beverage present inside the container, and thereby arrive at the claimed invention.  
With respect to applicants arguments filed in the letter of 2/26/01, it is noted that, absent evidence to the contrary, the broad disclosure of containers by either Christiani et al. or WO 93/04118 clearly encompasses all parts of a container including closure and sealant layer. Further, it is noted that while claims 5 and 9 are drawn to beverage container closure and beverage container sealant layer respectively, there are no structural limitations regarding the closure or sealant layer, and thus, the patentability of each of the claims is dependent on the compositional limitations which are met by either Christiani et al. or WO 93/04118.  
Thus, given that Christiani et al. or WO 93/04118 (i) broadly disclose containers and (ii) disclose composition identical to that presently claimed including that the composition decreases the gas permeability of thermoplastic material and given that the patentability of claims 5 and 9 depends on the composition, it therefore would have been obvious to one of ordinary skill in the art to utilize the composition of WO 93/04118 or Christiani et al. in any portion of the container, including the closure or sealant layer as presently claimed, where it is important that gas permeability is decreased in order to preserve the beverage present inside the container, and thereby arrive at the claimed invention.
7. Claims 1-13 meet the criteria set out in PCT Article 33(4), because the invention has industrial applicability as beverage container closure or sealant layer.

## ----- NEW CITATIONS -----

WO 93/04118 A1 (MAXFIELD ET AL.) 04 MARCH 1993 (04/03/93), page 5, lines 14-19, page 8, lines 30-31, page 9, lines 3 and 26-28, page 11, line 36, page 18, line 18, page 21, lines 3-5, page 26, lines 7 and 10-13, page 29, lines 30-32, page 30,